for your consideration...
SUGGESTIONS AND REFLECTIONS ON TEACHING AND LEARNING

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Classroom Activities for Active Learning

For well over a decade, the focus of the university classroom has steadily shifted from a teaching-centric approach to a learning-centric approach (Barr & Tagg, 1995). This shift calls for a rethinking of the traditional classroom, replacing the standard lecture with a blend of pedagogical approaches that more regularly involve the student in the learning process. Under a learning-centered approach, the instructor retains "control" of the classroom, but thought is regularly given to: (a) how well students will learn the material presented, and (b) the variety of pedagogically sound methods that may be employed to help the students better understand the core information to be learned.

There is now strong empirical evidence that active involvement in the learning process is vitally important in two areas: (a) for the mastery of skills, such as critical thinking and problem-solving and (b) for contributing to the student's likelihood of persisting to program completion (Braxton, Jones, Hirschy, & Hartkey, 2008; Prince, 2004). Below are a few strategies that can be used by faculty in a wide variety of courses.

Questioning Techniques

For those who use lecture as the primary delivery method in the classroom, there are a few relatively easy methods to increase student involvement and interest in the classroom, regardless of course level or academic field. At the simplest level, this approach requires asking questions during the lecture that challenge students to apply the concepts and principles introduced. Although most instructors would maintain that their students already ask questions during class, some college professors still devote only a small portion of class time to posing questions to students. Most of these questions are directed at the lowest cognitive level, requiring only recapitulation, clarification, or factual responses. Often only a small proportion of students regularly respond.

There are a few things an instructor can do to increase the number of different students responding in a given class period. One method is simply to change the way in which questions are asked. Periodically calling on students is a long-held method to determine which students are understanding the material and which are paying attention. The only downside to this approach is that some students are terrified to speak before a group, and when surprised with a quickly-delivered question the student may "freeze." One approach that often helps students is to teach them to quickly sketch out a response to a question in their notes. When posing questions, pause for 15 to 30 seconds and then call on students. The length of the pause can be adjusted based on the cognitive complexity of the expected response. Another method is to give some "thinking" questions or calculations at the end of class and tell students the next class will begin with students being called on to respond to those items. Finally, it is sometimes helpful to focus attention on a small area of the class and wait for a response from a student volunteer. This increases "pressure" for someone in that area to respond.

In addition to getting a variety of students regularly responding to questions posed in the classroom, it is important that the responses increase in cognitive levels as the course progresses. To insure that they ask questions from the higher cognitive levels, instructors who are adept at questioning usually prepare for class by writing their questions in the margins of their lecture notes or on their lesson plan. Also keep in mind that, although there are many degrees of cognitive complexity, for planning purposes three levels are particularly important: **remembering**, **applying**, and **evaluating** (Anderson & Krathwohl, 2001). At the lowest level, **remembering** questions help to ascertain whether the students have the facts

straight—can they recall or recognize basic information. Examples include:

- What is the difference between a sodium atom and a sodium ion?
- What three conditions must be met for something to qualify as a business asset?

Median level **application** questions require students to use information to: (a) deduce the significance of results of experiments, (b) apply formulas to new problems, (c) relate theoretical abstractions to real situations, or (d) analyze patterns of relationships among concepts and develop generalizations from them. Examples include:

- How would you explain the connection between confidence interval construction and hypothesis testing?
- How well do American secondary schools fit Weber's definition of a bureaucracy?

Evaluation questions require students to exercise judgment—one of the higher levels of cognition. Students must choose the best alternatives or solutions and be able to justify those choices (in other words, to demonstrate the same thought processes that a professional in the field uses to make decisions). Examples include:

- In this case study, what would you do if you were the company treasurer?
- How could the nation experience rapid inflation and high unemployment at the same time?

The skillful use of probing and follow-up questions will encourage students to try to answer the more difficult and complex questions. Lectures in which students are regularly asked to respond hold additional benefits for learning. Students have the opportunity to test their understanding of the material as it is presented, they have many chances to practice thinking critically and creatively, and their motivation to study and keep up with course assignments improves (Bligh, 2000).

Although a number of instructors at UNC report that they use questions to promote interaction even in very large classes, the method is clearly more difficult to use in larger sections. One approach that some instructors are using today involves audience response systems or "clickers." This technology allows the instructor to pose a question to the class and easily collect the responses. Advocates of this technological solution report that, when used in a learner-centered framework, the increased interaction through strategically posed questions can, among other things, assess prior knowledge; elicit a misperception; stimulate discussion; and exercise a cognitive skill (Beatty & Gerace, 2009; Fies & Marshall, 2008). Many of the strategies described in this issue are complemented by audience response systems.

Small Groups

Research comparing the effectiveness of lectures and discussions indicates that, although both techniques are similarly effective for knowledge-level learning, the results consistently favor discussion methods over lecture on a number of measures: problem-solving, transfer of knowledge to new situations, and motivation for further learning (Bligh, 2000). There are many small group techniques that may be used in almost any course with very little effort or risk. The primary focus is getting students to really think about the material so they are able to vocalize what it is they are thinking about.

Pair-Share. One of the easiest ways to get students talking about an issue or topic in class is to use the "think/write–pair–share" method. (Lyman, 1992). In this approach, an instructor simply poses an issue or problem to the class and then gives students 30 seconds to one minute to think about or write out their response. Students then pair up and explain their responses to one another for 3 to 5 minutes. Finally, as a class, the issue or result is discussed. Because this technique takes only about 4 to 6 minutes of class time, it could be done one or two times in each class session. This format has worked successfully in many different kinds of courses including math, chemistry, history, philosophy, and art criticism. In a variation on the technique, the instructor asks students to vote on an issue (e.g., "Would you have voted to award President Obama the Nobel Peace Prize?"), then asks individuals about what informed their decision. The class is asked to vote again, and students who changed their votes are asked why they did so (Fink, 2003).

Buzz Groups. McKeachie (2006) uses a buzz group technique to ensure student participation in large classes. In his lectures, when he comes to a concept that lends itself to discussion, he asks students to form groups of five to eight people to talk about the issue. He instructs them to make sure each member of the group contributes at least one idea to the discussion. After 10 minutes, he calls on some of the groups to report and asks other groups who came to the same conclusion to raise their hands. As they report, he records their main points on the blackboard and then incorporates the material into a future lecture.

Three-Step Interview. For this small group process, students first work in pairs. The first person in the dyad interviews or questions the second person. The second person then interviews or questions the first person. For the next step, two dyads work together. One person from the first dyad explains their conclusion or summary to the second dyad, and one of the individuals from the second dyad explains their summary or results to the first dyad.

Whole Class Involvement

The Lecture Check (Mazur, 1997). This strategy works very well in large classes, but is equally effective in smaller class enrollments. The first step is to deliver a lecture for 15 to 20 minutes, and then project a question for the class to see. Often this is a multiple choice item that is similar to the type of question that will be used on an exam. Students are asked to raise their hands as the instructor asks how many think 'a' is the correct response; how many chose 'b,'; and so on. If most of the students have the correct response, the instructor simply continues with the course material. If, however, more than approximately 20% chose the incorrect response, the instructor has students turn to their neighbor and convince them of the correct choice. Finally, the instructor goes through the items again to see how many choose each alternative. If an unacceptable number still have incorrect responses, it may be wise to go back over the material. Students also can be called on to defend the selection they have made.

Whole-Class Debates (Frederick, 2002). Taking advantage of the dividing aisle in large lecture halls, the instructor assigns sides of a debate to the two halves of the class (or, by prearrangement, students sit on the side of the room representing the point of view they wish to support). The instructor asks each side for five statements supporting their side of the issue. This process may be repeated, with rebuttals, until the instructor feels that the class has fully explored the issue. To end the debate and achieve closure, the instructor asks for two or three volunteers to make summary arguments for each side.

Role-Playing and Debates (Fredrick, 2002). A simple definition of role-playing is a loose simulation in which students assume the roles of individuals or groups in a real-life situation. Contemporary issues in the social sciences are often appropriate for these kinds of simulations (for example, the placement of a toxic-waste dump, the forced integration of an ethnic neighborhood, or the opening of a nuclear power plant). In order to plan such an exercise, the instructor must clearly identify the situation, define the roles of the interest groups involved, and specify the task for each group. These proposals will inevitably conflict ideologically, tactically, economically, regionally, or in some other fundamental way. The class usually begins with a mini-lecture to establish the context and setting, after which students work on their proposals in their assigned groups. When they have finished, the instructor can hear the proposals and immediately incorporate them into a lecture on how closely they reflect positions people have taken in these conflicts (and the implications for society).

Although all of the exercises outlined above have been used successfully in auditorium-style classrooms, it is true that the physical arrangement of the room and the number of students in the class can make some of the exercises difficult to carry out. Instructors report, however, that students will often find creative ways to overcome these environmental constraints in order to have the opportunity to exercise their minds more actively in the classroom. These exercises require careful planning by the instructor and adequate preparation by students. They should not be used as a substitute for lecturing, but rather as an integral part of the learning experience.

Reading & Writing Exercises

In-class reading and writing exercises also promote student engagement in the learning process, even in large classes. Often, in-class exercises can be used to gauge student learning, to help students think more deeply about the course material, and prompt class discussion.

Close Reading. A time-honored technique that improves reading comprehension and provides a measure of engagement in the subject matter is the Close Reading Method (Bass & Linkon, 2009). In class, the instructor models how to read and interpret a passage while the students follow in their books. After this demonstration, individual students may be called upon to read aloud and interpret similar selections. In a literature course, after reading particularly ambiguous passages of a novel or poem, students might be asked to discuss them in groups of two or three to decide what the selection means, paraphrasing it in their own words. The instructor can ask a few of the groups to give their interpretations before providing his or her own analysis. This technique works well for other kinds of analysis and interpretation: for example, teaching students in an economics course how to read a supply and demand curve, or, in an anthropology course, how to read an artifact. Finally, the technique can be used early in the semester in an introductory course to demonstrate how to read and highlight the textbook or the course readings.

Classroom Assessment Techniques. Some instructors use short, in-class writing assignments as a means to keep students mentally engaged in the course material and also as feedback to assess the extent to which students understanding the material (Angelo & Cross, 1993). Writing also helps them learn to express their thoughts more clearly and focuses their attention on important elements of the course. Short writing assignments (a paragraph or two) can be given as pre- and post-lecture activities. Requiring students to write their thoughts or questions about the day's topic before the lecture begins will concentrate their attention on the topic and prepare them for active listening. At the end of the presentation, writing out their impressions of the lecture, and any questions they have about the topic, will help them place the material in context. It also provides valuable feedback to the instructor as a collection of

possible test questions.

Students can be asked to write short summaries of material at any point during a lecture. In summarizing, they select the most pertinent elements from the material and restate them in their own words. This process of synthesis and personalization leads to better, more permanent learning. One math instructor at UNC, in classes in which she has introduced a new concept or procedure, always ends by asking students to write a brief summary of it (e.g., how to solve a rational expression). Students also can describe the aspect of the material for the day they find most confusing. These "muddiest point" papers are an excellent method to determine what, if any, of the material is particularly confusing to the student.

How these written exercises are used in the course will depend upon the type of class, the instructor's objectives, the subject matter, and a variety of other factors. They could be collected and graded, kept in a journal (graded or ungraded), or simply used by the students themselves.

Concluding Thoughts

Actively engaging students in the classroom will help them think more deeply about the course content, bring additional energy to the classroom, and help identify the extent to which they may be struggling with the material. Active learning techniques have become increasingly common in recent years, and are being used extensively on UNC's campus. In addition to reading the published literature of active learning in your discipline, ask around your department. You may well learn a new technique that can be put to immediate use.

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